Pulse

An integrated technology platform to enable better spine surgery

NuVasive

Our purpose is to transform outcomes through best-in-class surgical technology.

We focus on advancing global adoption of less disruptive surgery and improving the standard of care by pairing industry-leading procedures with enabling technologies.

Everything you need in a single platform*

In a single expandable platform, Pulse integrates **multiple enabling technologies to improve workflow, reduce variability and increase the reproducibility of surgical outcomes.**

- Neuromonitoring
- Rod bending
- Global alignment
- Radiation reduction and imaging
- Navigation

*The Pulse platform can be used in every procedure; however, not all modalities are cleared for every procedure. Refer to Pulse system instructions for use.

Supporting 100% of spine

The Pulse platform can be utilized in various spine cases. This level of utility currently rivals all competitive systems in the market, addressing a wider range of clinical challenges.

Procedure category	Pulse*	Standalone navigation	Standalone robotics
ACDF	•		
PCF	•	•	
PLIF	•	○	○
TLIF	•	○	○
ALIF	•		
XLIF	•	○	
TL posterior fusion	•	•	•
Deformity	•	•	•
Revision	•	•	•
Trauma	•	•	•
Decompression	•		
Microdiscectomy	•		
Spinal cord stim	•		
Spine cord (tumors, untethering, rhizotomy)	•		
Corpectomy (tumors, infection)	•	•	•
Kyphoplasty, SI fusion	•	•	○

• Supports procedure ○ May support procedure

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Today's challenges in spine surgery

Radiation exposure

Spine surgeons can reach radiation exposure limit in ~10 years.[1]

OR workflow

Proliferation of stand-alone technology impacts OR footprint.

Visualization

Minimally invasive surgery (MIS) increases critical need for surgical visualization.

Variability in outcomes

Malalignment, nerve and spinal cord injury, symptomatic pedicle breach and screw pullout.

Surgical costs

Manual rod manipulation and screw placement with fluoro can lead to more time in the OR.

Customized to meet your unique needs

Pulse is designed to scale with you. The platform's modular architecture allows for flexible technology packages. This enables you to select the tools necessary to address specific pathologies and spine surgeries.

More than the sum of the parts

Pulse is the first spine technology platform to integrate independent, enabling technologies and service for a more effective and meaningful delivery of information.

Enhanced integration with 3D mobile C-arm

While Pulse is an open imaging platform, it offers enhanced integration with Siemens' cutting-edge 3D mobile C-arm, the Cios Spin®.

The Cios Spin features are based on dedicated 3D technologies, more efficiency in 3D imaging built on a smart plug-and-play concept, and more cost-effectiveness in surgery.

Support for your hospital

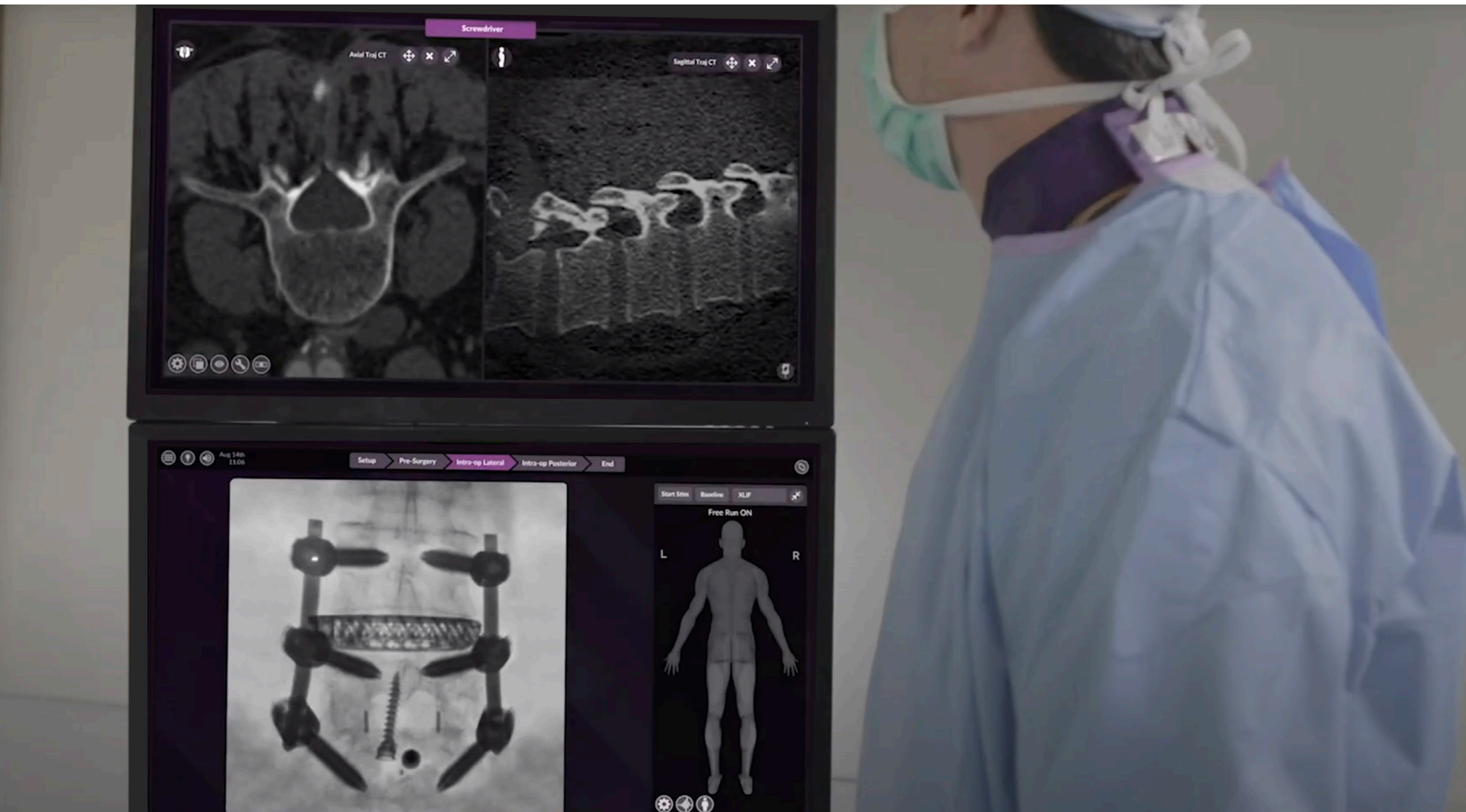
Tailored service packages to support all Pulse applications, including neuromonitoring, as well as training for hospital staff.

To meet clinical needs, support options include: in-case, technical and by phone.

Independent access for everyone in the OR

A key focus of the Pulse platform is to help connect everyone in the operating room to create a more efficient surgical experience. The platform's built-in wireless functionality allows everyone supporting the case to access the technologies independently. This means the spine surgeon, neurophysiologist, C-arm technician and others can all work simultaneously, while still communicating relevant information.

For example, a neurophysiologist can run a twitch test and set intraoperative neuromonitoring baselines from their laptop while the surgeon measures spinal alignment parameters from a tablet device. In the meantime, a C-arm technician can take initial patient positioning X-ray images while another member of the OR staff can assign arrays and confirm instruments. This type of efficiency in workflow and integration of technologies is unrivaled by current competitive systems in the market.



Multiple technologies to help deliver a better procedure

Neuromonitoring

Neuromonitoring is a foundational requirement in every spine surgery. Our services and technology provide proprietary automated nerve detection with standardized setup and clinically validated alerts[2] to help reduce variability and allow for faster interpretation of neural information.

Global alignment

Our Integrated Global Alignment technology offers surgical planning and intraoperative assessment tools to help surgeons correct or restore spinal alignment. Intraoperatively assess the surgical approach and its effects on spinal alignment through real-time insights. Surgeons can later follow up postoperatively to assess the result of the procedure.

Patient-specific rod bending

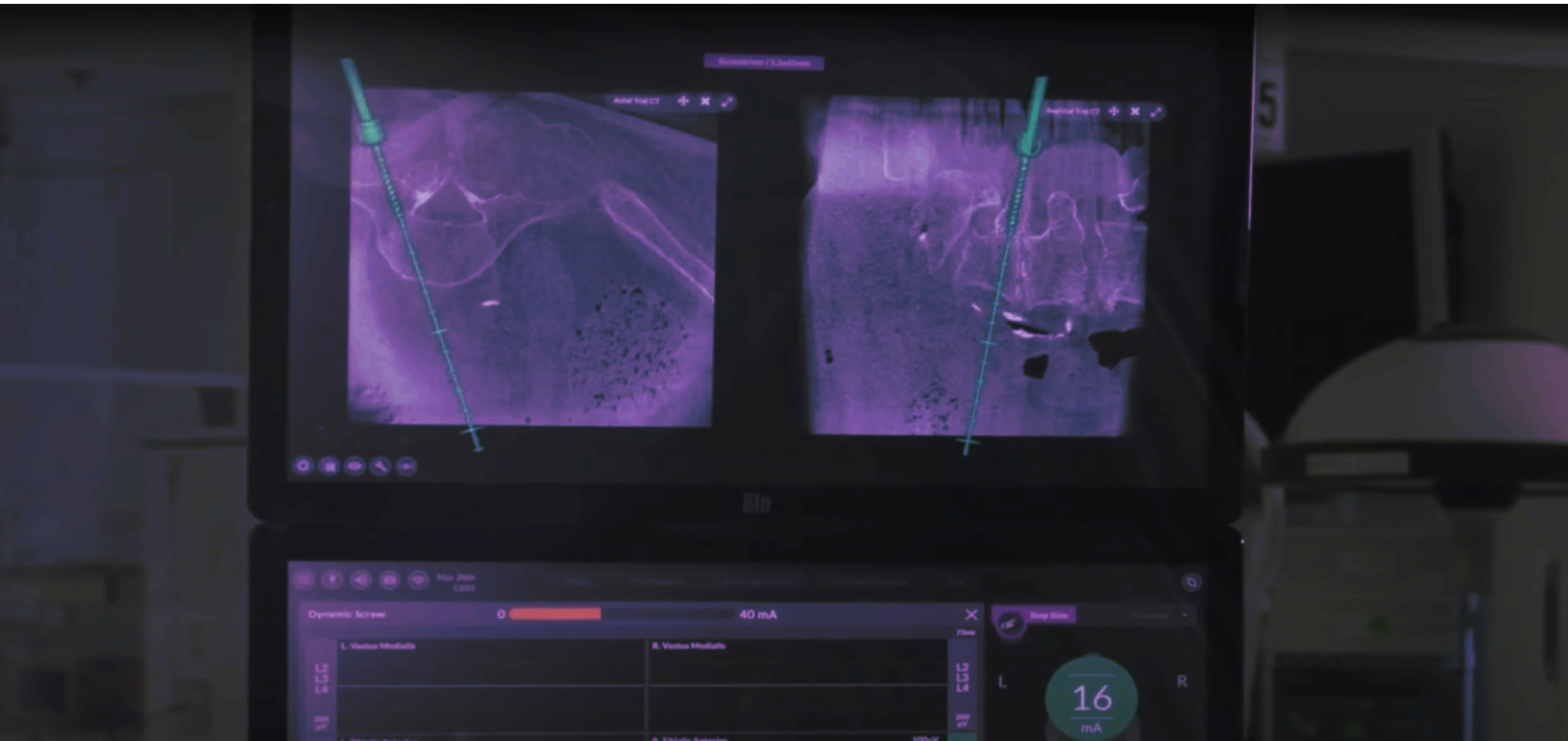
Bending spinal rods during surgery can be time-consuming and subjective. Our spinal rod bending technology is used to create patient-specific rods which are bent to implant locations. Bendini expedites manual rod manipulation through computer-assisted bend instructions, designed to benefit both surgeons and patients.

Smart imaging with radiation reduction

The use of X-ray imaging in MIS has greatly enhanced visualization. X-ray imaging is correlated with radiation exposure, which has been shown to have a negative impact on health through repeated exposure.[3] The Lessray* technology was designed to increase OR efficiency through streamlined imaging workflow, while also significantly reducing exposure to radiation for everyone in the room.[4]

Precision through 3D imaging and navigation

Navigation in spine surgery offers the potential for more surgeons to adopt MIS techniques while improving implant accuracy and minimizing radiation. However, the complexity and time requirements of existing solutions have impeded adoption of navigation into the majority of spine surgeries. Pulse introduces a procedurally integrated navigation technology that features workflow technologies to improve ease-of-use and surgical efficiency in the OR.



Notes

References

1. Bindal RK, Glaze S, Ognoskie M, et al. Surgeon and patient radiation exposure in minimally invasive transforaminal lumbar interbody fusion. *J Neurosurg Spine* 2008;9(6)570-3.
2. Tohmeh AG, Rodgers WB, Peterson MD. Dynamically evoked, discrete-threshold electromyography in the extreme lateral interbody fusion approach. *J Neurosurg Spine* 2011;14(1):31-7.
3. Vano E, Kleiman NJ, Duran A, et. al. Radiation-associated lens opacities in catheterization personnel: results of a survey and direct assessments. *J Vasc Interv Radiol* 2013;24(2):197-204.
4. Wang TY, Farber SH, Perkins SS, et al. Internally randomized control trial of radiation exposure using ultra-low radiation imaging versus traditional C-arm fluoroscopy for patients undergoing single-level minimally invasive Transforaminal lumbar Interbody fusion. *Spine* 2017;42(4);217-23.

Pulse navigation is not presently indicated for use in cervical procedures in the EU. For important product safety information please visit **nuvasive.com/eIFU**

NuVasive, Inc.
7475 Lusk Blvd., San Diego, CA 92121 USA
+1 800.475.9131

EC REP **NuVasive Netherlands B.V.**
Jachthavenweg 109A, 1081 KM Amsterdam, The Netherlands
+31 20 72 33 000

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